



# MOTORTRONICS™

Solid State AC Motor Control

# VMX-synergy™

## ETHERNET IP MODULE USER GUIDE



# Ethernet IP User Guide

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# Module Description

## Ethernet IP Interface User Guide

### Caution

This option module is specifically designed to be used with the VMX-synergy™ range of soft-start products and is intended for professional incorporation into complete equipment or systems. If installed incorrectly it may present a safety hazard. Before commencing installation and commissioning, the user should ensure they are fully familiar with the VMX-synergy™ unit and have read the important safety information and warnings contained in the VMX-synergy™ User Guide.

### Overview

The Ethernet IP Interface is intended to be installed in the VMX-synergy™ option slot and allows the VMX-synergy™ to be connected to an Ethernet IP network. The interface offers the following functionality: -

- CIP Parameter Object Support
- 7 Input control Words from the network master to VMX-synergy™
- 5 Output status and data Words from VMX-synergy™ to the network master

### Installation

See Appendix 1

### VMX-synergy™ configuration

- VMX-synergy™ will automatically configure when the option module is installed

### EDS File

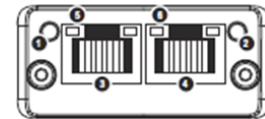
- An EDS file for the interface is available from [www.motortronics.com](http://www.motortronics.com)

### IP Address Configuration

- Use the IP address configuration tool.  
Available from:  
[www.motortronics.com/downloadVMX-synergy](http://www.motortronics.com/downloadVMX-synergy)  
(the tool is contained in the EDS zip file)

### Front panel

Item	
1	Network Status LED
2	Module Status LED
3	Ethernet Interface, Port 1
4	Ethernet Interface, Port 2
5	Link/Activity Port 1
6	Link/Activity Port 2



### Network status LED

LED State	Description
Off	No power or no IP address
Green	Online, connections active
Green, flashing	Online, no connections active
Red	Duplicate IP, fatal error
Red, flashing	Connection timeout

### Module status LED

LED State	Description
Off	No power
Green	Controlled, Run state
Green, flashing	Not configured or idle state
Red	Major fault
Red, flashing	Recoverable error(s)

### Ethernet interface LED

LED State	Description
Off	No link, no activity
Green	Link established (100 Mbit/s)
Green, flickering	Activity (100 Mbit/s)
Yellow	Link established (10 Mbit/s)
Yellow, flickering	Activity (10 Mbit/s)

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# Programming

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## **Ethernet/IP Control and Data Mapping**

The interface is supported by the EDS file provided for the Anybus AB6604-C M40 module<sup>(1)</sup> by HMS Industrial Networks.



Note: This user guide does not apply to the AB6274 M30 module. Consult MAN-SGY-006-V01

The Class1/Implicit cyclic connection is facilitated through the 150 and 100 assemblies described in the EDS. Connection 150 (0x96), O->T, requires the controlling system/PLC to supply seven words of data which dynamically set-up the function of the host VMX-synergy™, as well as select any required data to return through T->O as it is connected.

In its simplest control mode, the first 16-bit word (1) can be used to enable or disable the control bits described below. See [Table 1](#) to describe each bit's function. To make bits 0 to 3 visible to the VMX-synergy™, bit-4 (Network Control) must be set.

The next two words (2,3) allows the PLC to set discreet values into selected PNUs. Word 2 is used to select the PNU that is to be written to and word-3 carries the value to be assigned to that PNU<sup>(1)</sup>. Note that word 3 is a 32-bit container and thus allows writing of values of up to 32 bits long. PNUs that require values less than 32 bits will ignore/truncate the more significant bytes passed into the word 3 during the assign process. If word-2 is set to zero, no data will be assigned. Note also that PLC output array will normally have to be specified as eight 16-bit words and the ladder logic will need to split a 32-bit data word in to what would be word-3 and word-4 of that working array. The entire O->T message size must be specified as 16 bytes long.

The last four 16-bit words (4,5,6,7) allow the selection of what PNU data will be returned in the T->O frame "Selected PNU n Value" described in [Table 2](#). Each address set to zero will cause the return value of 0.

WORD	BITs	Value	Note
1	16	Control Word	Bit 0: Start/Stop Bit 1: Freeze Ramp Bit 2: Reset Bit 3: External Trip Bit 4: Network Control Bit 5-15 Reserved
2	16	Write Select PNU Address	Address where word 3's value is assigned to. If zero/null there is no copy assignment.
3	32	Write Value	Value written to the Write Select PNU (assigned in word 2, above). If the PNU expects a 16-bit value, then only Least Significant 16bits are copied.
4	16	Read Select PNU 1 Address	Selects the first datum copied to connection 100
5	16	Read Select PNU 2 Address	Selects the second datum is copied to connection 100
6	16	Read Select PNU 3 Address	Selects the third datum is copied to connection 100
7	16	Read Select PNU 4 Address	Selects the fourth datum is copied to connection 100

**Table 1. Connection 150 O ->T message frame.**

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<sup>1</sup> See Modbus section of VMX-SGY-UM

# Programming

In response Connection 100 (0x64), T->O, delivers five 32-bit words contain the status and requested PNU data. Word 1 carries the status and any fault code. [Table 2](#), describes the meaning of each of the 6 bits making up the status report. If bit-1 (Trip) is set then the upper 16-bits of the status word will contain the trip code that describes the fault. See the main VMX-synergy™ manual for lists of Trip codes. The remaining four words will contain any PNU values corresponding to the selected PNU addresses specified in the last four words of Connection 150.

WORD	BITs	Value	Note
1	32	Status	Status value defined as: Bit 0: Error/Fault/Trip Bit 1: Running Bit 2: End Of Start Bit 3: Current Limited Bit 4: iERS Active Bit 5: Stopping Bit 6: Network Control Active Bit 7-15: Reserved Bits 16-31 Trip Code
2	32	Selected PNU 1 Value	If a value is less than 32 bits it will be assigned to the least significant part. If larger then 32 bits it will be truncated to its 32bit least significant part.
3	32	Selected PNU 2 Value	..as above
4	32	Selected PNU 3 Value	
5	32	Selected PNU 4 Value	

**Table 2. Connection 100 T->O message frame.**

## Class 3 Explicit packets

All the datum described in the class 1 section can be addressed individually as explicit/class 3 messages using the following CIP addressing.

Name	Read Only	Bytes	Class Hex	Instance Hex	Attribute Hex
Control Word		2	A2	2	5
Status	Yes	4	A2	3	5
Write Select PNU Address		2	A2	100	5
Write Value		4	A2	101	5
Read Select PNU 1 Address		2	A2	102	5
Read Select PNU 2 Address		2	A2	103	5
Read Select PNU 3 Address		2	A2	104	5
Read Select PNU 4 Address		2	A2	105	5
Selected PNU 1 Value	Yes	4	A2	106	5
Selected PNU 2 Value	Yes	4	A2	107	5
Selected PNU 3 Value	Yes	4	A2	108	5
Selected PNU 4 Value	Yes	4	A2	109	5

**Table 3. Explicit packets**

# Programming

## **PLC connection and programming guidance.**

The example below is taken from a commercially available PLC interface and should be transferable, with the appropriate changes, to others.

EIP Client Properties. Tag names are just specified for this example. The IP Address would be changed to suit.

The screenshot shows the 'EIP Client Properties' configuration window. It includes fields for 'Device Name' (SGY), 'Ethernet Port' (CPU-ETH-Ext), 'IP Address' (192.168.1.2), and 'TCP Port Number' (44818). There are also dropdown menus for 'TCP Connected' (SGY\_Connected), 'Adapter Name' (SGY\_Name), 'Vendor ID' (SGY\_VendorID), and 'TCP/IP Error' (SGY\_TCP\_Error). A checkbox for 'Use Structure' is present. Below these are options for 'Close unused CIP Session after' (30 secs) and 'Swap Byte Order'. A green plus icon is next to a tab labeled 'MSG1 [I/O]'. Under this tab, there are dropdowns for 'Enable' (SGY\_Enable), 'Connection Online' (SGY\_Online), 'General Status' (SGY\_Status), 'Extended Status' (SGY\_Ext\_Status), and 'Status Description' (SGY\_Status\_Descriptor). There is also an 'Enable Routing' checkbox and a 'Slot Number' field (0).

The screenshot shows the 'Target To Originator (INPUT) Data' configuration window. It has tabs for 'T->O (INPUT)', 'O->T (OUTPUT)', and 'CONFIG DATA'. The 'T->O (INPUT)' tab is selected. Fields include 'Delivery Option' (Multicast), 'RPI Time (msec)' (250), 'Assembly Instance/Connection Point' (100, 0x64), 'Datatype: Integer, 32 Bit, 1D Array', 'Data Array' (SGYDataOut), 'Message Size (bytes): 20', and 'Number of Elements' (5).

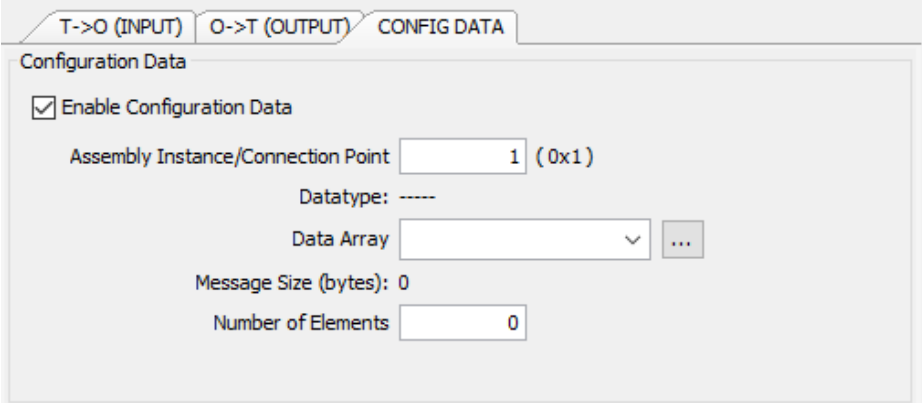
T->O setting reflect [Table 2](#) contents.

The screenshot shows the 'Originator To Target (OUTPUT) Data' configuration window. It has tabs for 'T->O (INPUT)', 'O->T (OUTPUT)', and 'CONFIG DATA'. The 'O->T (OUTPUT)' tab is selected. Fields include 'RPI Time (msec)' (250), 'Assembly Instance/Connection Point' (150, 0x96), 'Datatype: Integer, 16 Bit Unsigned, 1D Array', 'Data Array' (SGYDataIn), 'Message Size (bytes): 16', 'Number of Elements' (8), and a checked 'Include Status Header' checkbox.

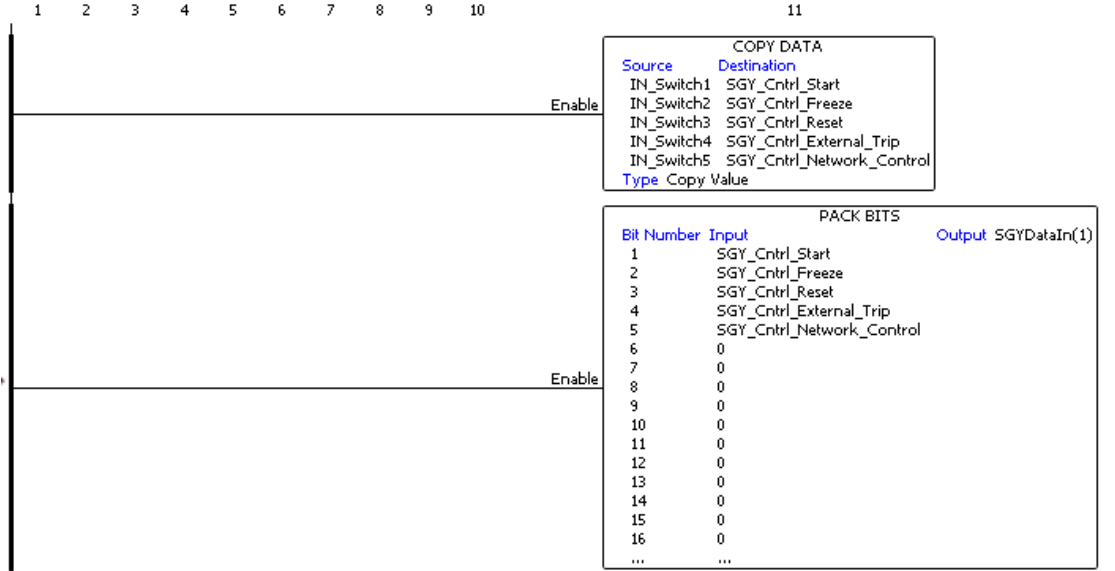
O->T settings reflect [Table 1](#) contents. Note that this is specified as an array of 16 bit integer.

# Programming

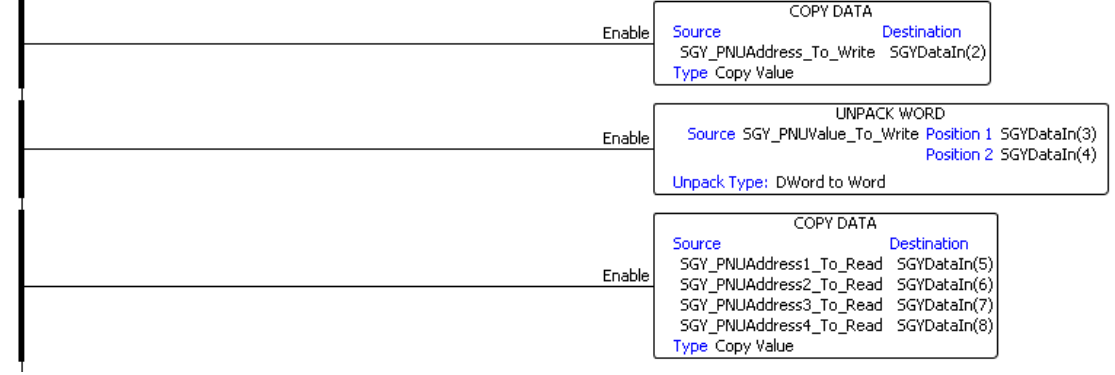
There is no configuration data required, but the HMS module requires that it is enabled with zero content as shown here.



Ladder logic will need to be written which can load the required control bits into SGYDataIn(1). The example below is using a bank of switches, each of which are assigned to a Boolean which in-tern are packed into the first word of the O->T frame defined above.

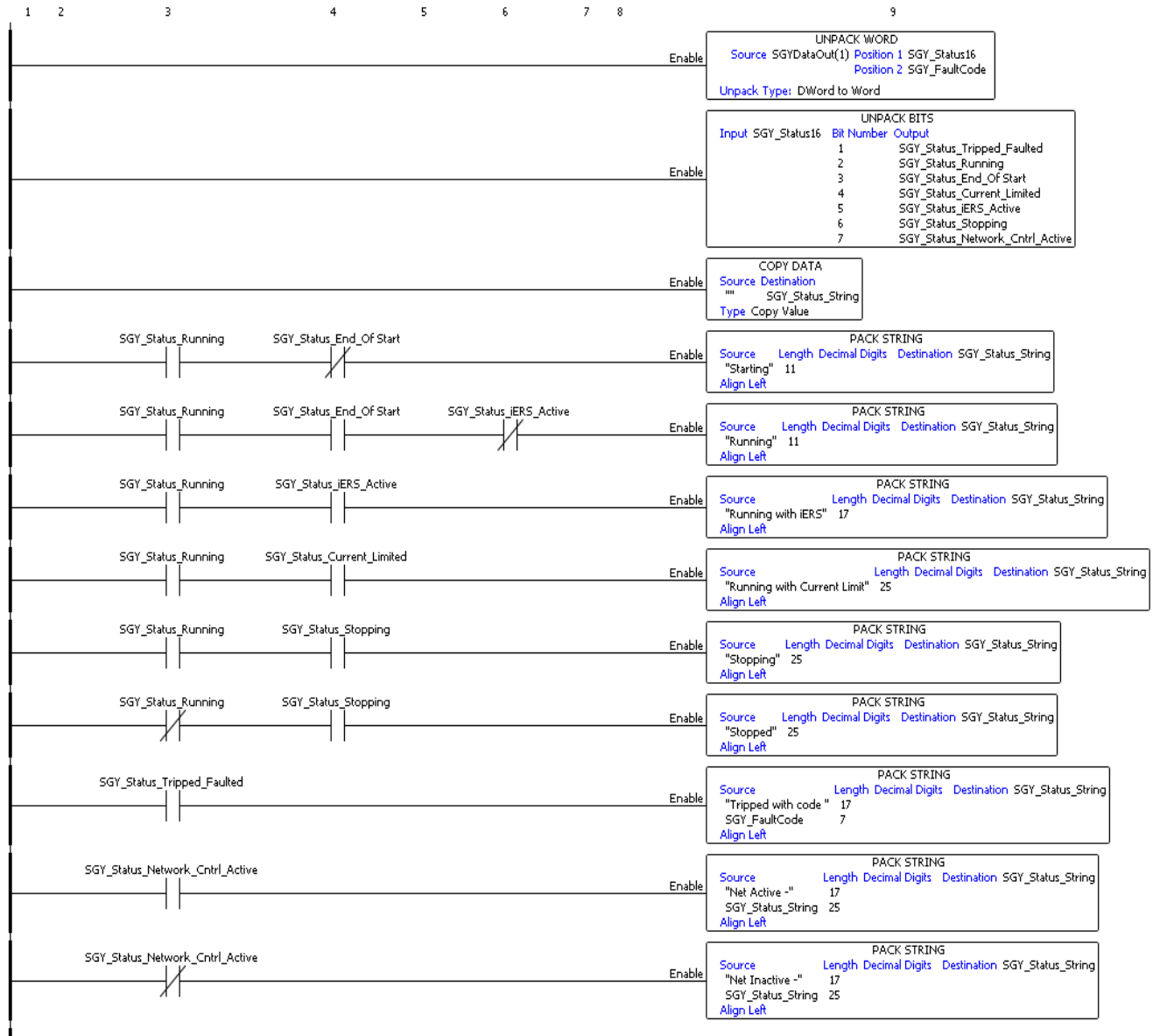


The remainder of the O->T frame will need to be populated as show below. Note the unpacking of the 32bit values into the two successive 16bit array members.



# Programming

The T->O frames members can be copied piece wise with the status word being stripped out. The following example shows this with the added functionality creating a description string of the status for MMI use.





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# Appendix 1

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## Anybus Module Installation

- 1) Ensure that all power is removed from the VMX-synergy™ soft starter prior to installing the option module.
- 2) Remove the blanking plate from the VMX-synergy™ option module slot.
- 3) Carefully slide the communication module into the VMX-synergy™ module slot applying slight downward force and forward pitch as shown in Fig 1. As the module moves into the VMX-synergy™ unit, it will be necessary to reduce the pitch of the module Fig 2a and 2b. As the module approaches full insertion, apply slight downward pressure and push fully home Fig 3.



Figure 1



Figure 2a



Figure 2b

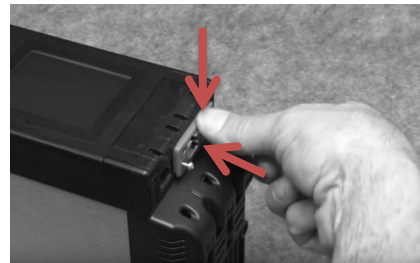


Figure 3

- 4) Ensure no gap is present between the module flange and the VMX-synergy™ body.
- 5) Tighten the T9 screws to lock the module in place (Do not over tighten).

### California Customers:

#### California Proposition 65 Warning

WARNING: this product and associated accessories may contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information visit <https://p65warnings.ca.gov>





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